REMARKS

Claims 1-6, 12-14 and 21-36 are canceled.

Claims 7-11, 15-20, and 37-46 are pending in this application.

Claims 7-11, 15-20, and 37-46 are rejected.

The non-final office action dated August 13, 2009 indicates that claims 7-11 and 37-40 are rejected under 35 USC §112, first paragraph, for failing to comply with the written description requirement. The office action alleges that the term "mono-stable condition" is not supported by the specification. We respectfully disagree. The specification discloses latch up, which refers to a monostable condition of a circuit, in which current continues in a self-sustaining manner. Moreover, the Patent Office has not met the initial burden of presenting by a preponderance of evidence why a person skilled in the art would not recognize in an applicant's disclosure a description of the invention, as required by MPEP 2163.04. For these reasons, the '112 rejection should be withdrawn.

The office action also indicates that base claims 37 and 41 are rejected under 35 USC §103(a) as being unpatentable over Kramer US Patent No. 6,466,539 in view of Gupta U.S. Patent No. 5,787,070 and Fuchs U.S. Patent No. 5,923,830. Gupta is newly cited. The '103 rejection is respectfully traversed.

Claim 37 recites a method of clearing latch-up and other single event functional interrupts in a data processing system having a plurality of nodes operatively connected to a serial data bus. In certain environments, the latch-up is radiation-induced. In the system of figure 1, for example, the physical layer controller, or the link layer controller, or both, can experience latch-up. The method includes

> periodically transmitting a first message from a first node to a second node on a first line of the serial data bus;
>
> determining whether the first message was received by the second node; and

> transmitting a recovery command to the second node if the second node does not respond to the first message, the recovery command transmitted via an alternative data bus path, the recovery command causing the second node to disrupt a monostable condition in the second node and restore functionality of the second node without disrupting the first node and any other nodes of the plurality.

Three documents are cited in the '103 rejection, none of which describe a system for clearing latch-up in a faulty node without affecting other nodes. Kramer _powers down an entire system_ when a fault in the system is suspected. Fuchs _resynchronizes all processors in a system_ if a mono-stable condition is suspected in a faulty processor. Gupta doesn't even attempt to disrupt a mono-stable condition, it simply _replaces a failed node_ with a redundant node.

The office action does not see the forest for the trees. It cites three documents that disclose three different approaches. All three approaches are different than the approach recited in claim 37. The office action does not appreciate the general nature of the applicant's approach. Instead, it gets mired down in details as to whether the documents disclose the individual features. Because the cited documents do not teach or suggest the methodology recited in base claim 37, the '103 rejection of base claim 37 and its dependent claims should be withdrawn.

The '103 rejections should be withdrawn for the additional reason that the combined teachings of Kramer, Gupta and Fuchs do not produce a method having all off the features of claim 37. Kramer discloses a serial bus system having two data lines and a plurality of subscribers 14, 16, 18 and 20 connected to the bus system. The subscribers include a bus master 14 at one end of the line, a terminating module 16 at the other end of the line, and bus subscribers18 and 20 in-between. The bus master 14 and terminating module 16 send messages to each other, and the bus subscribers 18-20 check the messages to see whether they are received within a fault tolerance time (col. 6, lines 34-48).

If a bus subscriber receives an erroneous status message or does not receive a status message within a certain time period, a fault is assumed (col. 6, lines 44-47). The fault is assumed in either a bus line or a subscriber (col. 6, lines 46-47). Any subscriber detecting a fault can cause the entire system to go into a safe state (col. 6, lines 48-52). The safe state is a standstill of the technical system, device, or machine by cutting off power.

Kramer does not teach or suggest the following:

1. Identifying a specific node experiencing latch up or other single event functional interrupt (Kramer only identifies a system fault).
2. Sending a "recovery command" to a node experiencing latch up.
3. A node that can disrupt its own monostable condition and restore its own functionality without affecting other nodes in the system (Kramer shuts down the entire system).
4. Using an alternative bus path to send a recovery command.

Thus, Kramer does not teach or suggest transmitting a recovery command to the second node if the second node does not respond to the first message, the recovery command transmitted via an alternative data bus path, the recovery command causing the second node to disrupt a monostable condition in the second node and restore functionality of the second node without disrupting the first node and any other nodes of the plurality.

Fuchs and Gupta are cited to provide evidence of the level of ordinary skill in the art. However, these documents do not provide a logical jump from Kramer's system to the method of claim 37.

Unlike Kramer, Fuchs does address single event upsets in a node. Fuchs discloses a computer system that is supposed to tolerate and manage single event upsets in a computer having multiple processors (col. 9, lines 11-18). Each processor

is connected to a power switch (col. 10, lines 11-18). A processor can be shut down by turning off its power switch.

The processors perform a voting operation to determine whether a processor has a fault. If the vote indicates a faulty processor, all processors are resynchronized (col. 11, lines 14-17). If the fault persists after resynchronization, a latch up is assumed (col. 11, lines 18-19). To remove the latch-up, the power switch of the faulty processor is turned off, thereby powering down the faulty processor (col. 11, lines 19-20). See also col. 15, lines 1-11. As Fuchs notes, these steps are performed in a single computer (col. 11, lines 26-28). Fuchs discloses a second computer system, but only for backup (col. 9, lines 26-27).

Fuchs does not disclose an architecture that allows a node to clear its own latch-up. Fuchs does not teach or suggest a processor that can correct its own latch up (an external switch cuts power to the processor). Fuchs does not teach or suggest an alternative bus path for a recovery command. Fuchs does not teach or suggest an architecture that corrects only the node experiencing latch-up (resynchronization, which is performed to identify possible latch-up, affects all of the processors).

Although Gupta is newly cited, its relevance isn't clear. Gupta discloses a communication controller including a plurality of service modules, a redundant module, and a mechanism for substituting the redundant module for any one of the service modules (Abstract, and col. 2, lines 63+). Gupta provides an example in which a service module 64 fails (col. 5, lines 11+). Upon detection of the failure, an appropriate relay is activated (col. 5, lines 41-48). The activated relay couples a low speed communication link to a line interface circuit via a redundancy bus (col. 5, lines 49-56). The line interface circuit transfers digital communication signals to a switching circuit (col. 5, lines 59-61). The switching circuit transfers the digital communication signals to module 64 (col. 5, lines 63-67). In this manner, "service module 60 is effectively substituted for the service module 64 upon activation of the relay 92" (col. 6, lines 2-4).

Gupta does not teach or suggest transmitting a recovery command to the node 64 if the node 64 does not respond to a first message, the recovery command transmitted via an alternative data bus path. Gupta does not teach or suggest a recovery command that causes node 64 to disrupt a monostable condition and restore functionality of the node 64 without disrupting any other nodes 60-63. Rather, Gupta substitutes node 64 with node 60.

Thus, the combined teachings of Kramer, Gupta and Fuchs do not disclose all features of the method of claim 37. For this additional reason, the '103 rejection of claim 37 and its dependent claims should be withdrawn.

Moreover, the office action does not provide a clear articulation for combining the features that are disclosed by Kramer, Gupta, and Fuchs. The office action alleges that the motivation of using Gupta's teachings is to provide "redundancy in the network." However, the office action does not offer any articulation as to why redundancy in Kramer's system would be beneficial to Kramer's system, or how the specific teachings of Gupta would be applied to Kramer's system, or how Kramer's system would be modified.

The office action alleges that the motivation of using Fuchs's teachings is to provide "circuit stability in hazardous environment". However, the office action offers no factual underpinnings to suggest that shutting off one of several processors in a computer would solve Kramer's problem, nor does it offer a clear articulation of how the modifications to Kramer would achieve circuit stability. Kramer's subscribers appear to be industrial machinery. Kramer does not identify radiation-induced latch-up as a potential hazard.

According to MPEP 2143, the "key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." However, the office action does not provide a clear articulation. For

this additional reason, the rejections of base claim 37 and its dependent claims should be withdrawn.

The office action does not establish prima facie obviousness of additional features recited in the dependent claims. For instance, Kramer, Gupta and Fuchs are all silent about latch-up in a node having physical and link layers (claims 38-39 and 42-43). Since Kramer is silent about the components of the controllers 56-62, it follows that Kramer is also silent about dc-isolation of the physical layer controller from the link layer controller, and that disrupting a monostable condition in the link layer controller is independent of disrupting a monostable condition in the physical layer controller. This allows surgical correction of a latch-up, without having to power down an entire component.

Kramer, Gupta and Fuchs are silent about detecting a surge which might indicate latch up (claims 10 and 15). Fuchs assumes that a processor is experiencing latch-up if resynchronization fails. Kramer's system determines whether heartbeat messages are received, and shuts down the system if the messages are not received. Gupta is altogether silent about latch-up.

Finally, the office action does not comply with MPEP 2141, which states "Office personnel should consider all rebuttal evidence that is timely presented by the applicants when reevaluating any obviousness determination. Rebuttal evidence may include evidence of "secondary considerations."

In an earlier response, a NASA Tech Brief entitled "Radiation-Tolerant Dual Data Bus" was made of record. The Tech Brief was published by NASA (at http://www.techbriefs.com/content/view/2079/34/1/0/). The Tech Brief describes work done by the applicant and recited in the claims

NASA Tech Briefs in general describe innovative approaches to problems that are of concern to NASA. They call attention to leading edge work within the NASA

community. In this instance, the problem of concern to NASA is radiation-induced latch-up and other single-event upsets. In the opinion of the experts in the field, the claimed invention offers an innovative approach that enables "error-free operation of a data bus that includes ... components that are inherently susceptible to single-event upsets."

The Tech Brief suggests that the claimed invention is beyond the level of ordinary skill. Thus, the Tech Brief provides evidence of non-obviousness of base claims 37 and 41 and their dependent claims.

MPEP 2142 states

> When an applicant submits evidence, whether in the specification as originally filed or in reply to a rejection, the examiner must reconsider the patentability of the claimed invention. The decision on patentability must be made based upon consideration of all the evidence, including the evidence submitted by the examiner and the evidence submitted by the applicant. A decision to make or maintain a rejection in the face of all the evidence must show that it was based on the totality of the evidence.

The office action does not consider the NASA Tech Brief. The NASA Tech Brief must be considered.

For these reasons, the documents made of record do not teach or suggest a method having all of the features of claim 37. Therefore, base claim 37 and its dependent claims should be allowed over the documents made of record.

For these same reasons, the documents made of record do not teach or suggest a system having all of the features of claim 41. Therefore, base claim 41 and its dependent claims should be allowed over the documents made of record.

The examiner is strongly encouraged to contact the undersigned to discuss any remaining issues before sending another office action.

Respectfully submitted,

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